

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

A Method of Reducing Cross-talking in Telephone Cables.

We, FELTEN & GUILLEAUME CARLS-
WERK ACTIEN-GESELLSCHAFT, of Köln-
Mülheim, Germany, a German com-
pany, do hereby declare the nature of
5 this invention and in what manner the
same is to be performed, to be particu-
larly described and ascertained in and
by the following statement:—

10 This invention relates to a method of
reducing cross-talking in telephone
cables.

15 In order to reduce cross-talking in
telephone cables, more particularly in
double telephone circuits (phantoms) it
has been proposed to balance the
inequalities of the capacities between the
conductors, hereinafter referred to as
"part capacities," which inequalities
20 are the cause of cross-talking, two
methods having become known in con-
nection therewith. According to one
method the conductors of the individual
sections of the lines are crossed at the
25 junction points in such a manner that
the inequalities of the capacities of the
successive sections are mutually com-
pensated, whilst according to the other
method, so-called balancing condensers
30 are added to the lines, by means of
which the part capacities which are too
small are increased and made equal to
the highest part capacities. These
methods have certain great disadvan-
35 tages. Thus, in the case of the first
method, the installing of the cable is
complicated, the crossings produce
irregularities in the sequence of the con-
ductors, which irregularities are a
handicap, more especially in the case of
40 repairs, and further, when individual
sections are replaced by new sections, it
is necessary to effect an entirely new
balance. The disadvantages of the
45 second method are: The increase in the
cost of the installation caused by the use

and mounting of the condensers and the
difficulty of maintaining the electric
properties of the latter permanently con-
stant.

50 The object of the present invention is
to provide a new balancing method which
is free from the disadvantages above
referred to. The invention makes use
of the fact that the differences between
55 the values of the part capacities pro-
duced during the manufacture of the
cables intended for phantom circuits are
small as compared with the actual
capacities of the lengths of manufacture,
60 so that it is possible, by effecting the
required alterations in the capacities of
the said lengths, in a portion thereof
which is short as compared with the
whole length, to balance the inequalities
65 for the whole length of manufacture.

According to the present invention the
required alterations in the capacities of
the sections are effected by altering the
dielectric conditions between the con-
ductors of the balancing portion. This
70 may be effected, according to the inven-
tion, either by covering with a common
band of electrically conducting material,
such as tin-foil, each two conductors of
the twisted phantom, the capacity
75 between which conductors is to be altered,
whereby the capacity of the length is
increased, or by reducing the distance
between the two conductors by a common
binding round the conductors, or by
80 increasing the said distance by insertions
between the conductors, the capacity of
the length being increased in the first
case and reduced in the second case. In
85 this way, alterations may be effected in
the part capacities of a normal paper
insulated telephone cable over a length
of a few metres, which capacity altera-
tions may amount to a few hundred
centimetres and are thus sufficient for 90

- having an influence upon one another, are compensated by correspondingly balancing the part capacities in a short portion of the length by altering the dielectric conditions between the conductors.
2. A method as claimed in Claim 1, consisting in this that the part capacity between two conductors of the balancing portion is increased by binding them together with a common band of electrically conducting material, such as tin-foil.
3. A method as claimed in Claim 1, consisting in this that the part capacity between two conductors of the balancing portion is increased by pressing them against one another by means of a common binding.
4. A method as claimed in Claim 1, consisting in this that the part capacity between two conductors of the balancing portion is reduced by moving them away from each other by means of insertions.
5. A method of balancing part capacities in the cable sections of telephone cables more particularly those having double telephone circuits (phantoms) consisting in this that instead of using ordinary junction sleeves, use is made of balancing sleeves in each cable section, according to requirements, which sleeves accommodate a portion of the cable, which serves as the short balancing piece referred to in Claim 1, and the part capacities of which are balanced as claimed in Claim 2, 3 or 4.
6. A method as claimed in Claim 5, consisting in this that the portion of the cable is subdivided in the balancing sleeves into a plurality of cables comprising a corresponding smaller number of phantoms.
7. The improved method of reducing cross-talking in telephone cables, substantially as described.
- Dated this 3rd day of April, 1924.
MARKS & CLERK.

[This Drawing is a full-size reproduction of the Original.]

